



Chambers's Journal

SIXTH SERIES.

LIMITATIONS.

Youth is chiefly conscious of life's possibilities; Age, of its limitations.

THE enthusiasm of youth—how soon we learn to marvel at it; to smile at the memory of that golden hour when all the world lay sparkling before us; when cloudy skies opened bright windows into infinitude; when all the air was full of pleasant stir and murmur, of hands that beckoned, of voices that called! Life was long, the cup of immortality already at the lips; all things seemed possible to the brave young heart. When the ideal was so glorious, who could doubt the splendour of the reality? Who could guess that the triumph of achievement should pale before the glow of the conflict?—that of all the fair faces we were destined to meet none should ever seem as fair as that of our early hope? Yet so it is, though the knowledge comes but slowly; to some, indeed, beloved of gods and men, it comes not at all.

Not carelessly nor lightly do we part with our illusions. One by one they fade, they falter, they fail; and we pass on our way with clearer vision and colder heart. One by one the roses wither in our fingers, the golden apples turn to ashes, the siren voices grow tremulous and mute. We see our limitations. Recognising for the first time our own inherent weakness, we estimate—more justly, as we think—the strength of the barriers which use and wont have set up against us, and shake our heads sadly over youthful optimism and Utopian schemes. Once, blindfold, we rushed at a monster, to prove him, perchance, but a stuffed figure after all. Now we look, we balance, we hesitate, we yield.

Yet life without illusions—how bare it is, how cold! An earth without an atmosphere, stripped of all the cloudy pageant that daily feasts our eyes! Only those, indeed, who have gazed for weeks into the molten depths of a hot and cloudless sky, when the heavens seemed as brass seven times heated, and all life drooped beneath the pitiless

glare of day, can realise the longing then awakened for the golden mists of morning, the red bars of sunset, or for the fair white flocks of fleecy vapour 'shepherded by the slow, unwilling wind.' And the knowledge that we owe these splendours to a little water or a few grains of dust—does it affect our appreciation of them? Nay, our teachers talk to deaf ears. The cloud-land above us is still a fairy realm of infinite resource; and where they only perceive a 'foul and pestilent congregation of vapours,' we watch for white processions, hear Olympian thunders, or see 'aërial navies grappling in the blue.'

It is true that life grows more complex as we grow older. The world, once so sharply divided into good and evil, light and darkness, becomes the theatre where a thousand inconsistencies play their parts; where the wise man wears motley, while the fool has a reverend air; where the loudest laughter is he who is most used to the buffets of Fortune, and the heaviest sighs are oftentimes breathed by those whom Plenty has well-nigh surfeited with her favours. We change in much, but in nothing more than in the nature and magnitude of the claims we make upon the future. If we are worldly-wise, we moderate our expectations with each succeeding year, and look back with a tinge of wonder, not unmixed with amusement, at the boundless expectations of earlier days. What a wealthy aspect life must then have worn to justify the careless assurance with which we reckoned on the generosity of the untried years! Strangest perhaps of all, we looked upon happiness as our rightful inheritance, into whose certain possession we should come at no very distant date. To live, love, and be happy seemed the natural sequence of human events; and though each fresh experience brought forward a more unmistakable contradiction of this agreeable theory, we did not cease to flatter ourselves that, whatever the fate of a few unlucky individuals here and there, we at least must some day realise our expectations. Knowing not that happiness is but

an accessory to life, and one rarely attainable, we found our chief delight in the creations of our fancy and of our desire; and now, looking back on those youthful dreams with the juster perceptions of maturer years, we understand only too clearly that, when youth and hope were with us, we held the chief elements of joy within our hearts. The real delight was in the foretaste of anticipation, or, at the most, in the first brief, sweet moment of realisation. Our fairy visions have proved merely such stuff as dreams are made of, yet we wake with reluctance to face the cold reality; and, like Mr Zangwill's hero, echo with wistful approval Lessing's words: 'Dreams are our life.' It is a hard saying of Mr Morley's that 'experience often changes the idealist and the reformer first to doubter, then to indifferent, then to pure egotist, and last to hard cynic;' but there is only too much truth in the stern dictum. For the higher a man's hope is placed, the greater will be the reaction should it fail of realisation. The idealist and reformer is of all men the most sanguine in his youth. He resists to the last the attack made by Time and Experience on the citadel of his dreams; and, when forced to surrender to the inevitable, hides his rage and mortification beneath a cloak of indifference, or sears his secret wounds with thoughts of scorn.

'A cheap cynicism' is said to be the prevailing note of our time; and the remark only proves how hard it is to carry practical wisdom into the sphere of the emotions—in other words, how difficult it is to be reasonable where our feelings are concerned. Like scholars whose first high ambitions have failed, we are apt to pursue life's studies with listless eyes and indifferent interest. We have relinquished our cherished aims, but we have not allowed their place to be occupied by simpler ideals. Yet in every other department of life we

have long since recognised the fact of our limitations. Those 'spacious days' when philosophers and men of learning were wont to 'take all knowledge for their province' are of the past, and men realise that life is brief, that knowledge is infinite, and that he who would win power or fame must concentrate his attention on some particular branch of learning or of science. He is a wise man who has thus learned to limit his ambitions; he is a wiser who learns to moderate his desires. But though the rosy tints of sunrise have yielded to the more sober light of experience, there is no reason why 'the freshness of that early time' should not still revive our jaded energies. We may smile at the memory of its flushed fervours; but in our secret hearts we cannot but acknowledge that the old visions had a dewy purity and sweetness which shame our travel-worn ambitions; and happy indeed is he who preserves, to some extent at least, his faith—call it credulity if you will—in life's fairer possibilities. Like that 'true romance' of which our modern poet sings, his ideal may change its form, it may manifest itself in new and unfamiliar ways; but the 'shaping spirit' is still the same. He has exchanged, it may be, the dream of an earthly paradise for the daily routine of persistent effort, of high endeavour. He has learned to judge the conditions of life more accurately, to estimate the value of its rewards more justly—

To see a good in evil, and a hope in ill-success.

Exactng less from others, and more from himself, he clings to the belief that, within the narrow circle of his opportunities, he may yet realise some part at least of his boyish aspirations; may use the silent influence which he exerts in his day and generation

To speed the coming of the Golden Year.

THE RED RAT'S DAUGHTER.

CHAPTER IX.



OW, Monsieur Browne,' said Madame Bernstein as she seated herself with her back to the window, 'we can talk in comfort, and, what is better still, without fear of being disturbed. It is indeed kind of you to come and see me, for I expect you were considerably surprised at receiving my poor little note yesterday. What you must have thought of it I dare not think; but I must console myself with the reflection that it was written in the interests of another person, whose happiness is dearer to me than I can make you understand. To tell you the truth, it is a most delicate matter. I think you will admit as much when you have heard what I have to say.'

Browne accordingly reserved his judgment.

His distrust of the woman, however, was rapidly coming back upon him, and he could not help feeling that, plausible as her words were, and desirous as she appeared to be of helping a third person, she was in some way attempting to deceive himself.

'I beg that you will not consider me at all in the matter,' he said, seeing that he was expected to say something. 'I am, as you know, only too glad to do anything I can to help you. Perhaps it is regarding Mademoiselle Petrovitch that you desire to speak to me?'

'You have guessed correctly,' said madame. 'It is about Katherine. The poor child, as I have reason to know, is in terrible trouble just now.'

'I am indeed sorry to hear that,' said Browne,

a fear of he knew not what taking possession of him. 'But I hope the trouble is one that can be easily set right.'

'It is possible it may,' madame replied. 'But I think it depends, if you will permit me to say so, in a very great measure upon yourself.'

'Upon me?' cried the young man, this time with real surprise. 'How can that be? I should never forgive myself if I thought I had made Miss Petrovitch unhappy.'

'Not perhaps exactly in the sense you mean,' said madame, moving a little nearer him, and speaking in a tone that was low and confidential; 'but still you have done so in another way, Monsieur Browne. Before I go any further, however, it is necessary that I should remind you that I am an old woman.' Here she smiled a little coquettishly, as if to remind him that her words, in this particular instance, must not be taken too literally. 'I am an old woman,' she continued—'old enough to be your mother, perhaps; at any rate old enough to be able to say what I am going to say without fear of giving offence, or of having my motives misconstrued. Monsieur Browne, as you are well aware, Katherine is only a young girl, and, like other young girls, she has her dreams. Into those dreams you have come, and what is the result? I will leave it to your common-sense, and perhaps a little to your vanity, to read between the lines. Had you been differently situated it would not have mattered. But at the time that you rendered her that great service on the mountains above Merok she had no idea who you were. But later on, when you were so kind to us in London, though you did your best to prevent it, we discovered all about you. Immediately, as is often the way with young girls, a change came. She is simplicity itself. She is also the soul of honour. She feared to let her true soul be seen lest you might think that we were cultivating your acquaintance for the sake of your wealth.'

'I never dreamt of such a thing,' Browne replied indignantly. 'That is the worst part of being a rich man, Madame Bernstein. One-half of the world preys upon you for your money, while a large number will not be friendly to you lest they may be supposed to be doing the same. I should be a cad of the first water if I had ever thought for a moment that Miss Petrovitch was capable of such a thing.'

From the way he spoke Madame Bernstein saw that she had overshot her mark, and she was quick to make up for her mistake.

'I do not think I said that we thought so, Monsieur Browne,' she said. 'I only remarked that I feared my ward was afraid lest you might do so.'

'She might have known me better than that,' said Browne a little reproachfully. 'But perhaps

you will tell me what it is you wish me to do?'

'Ah! In asking that question you bring me to the most difficult point in our interview,' she replied. 'I will show you why. Before I do so, however, I want you to give me your promise that you will not be offended at what I am about to say to you.'

'I will certainly promise that,' Browne answered.

'I am going to put your friendship to a severe test,' madame continued. She paused for a moment as if to collect her thoughts. When she spoke again it was with an abruptness that was most disconcerting. 'You must be blind indeed,' she said, 'if you cannot see, Monsieur Browne, that Katherine loves you.'

The revulsion of feeling caused by her announcement of this fact was so strong that, though Browne tried to speak, he found he was incapable of uttering a word. And yet, though she seemed so certain of what she said, there was something in the way she said it that did not ring quite true.

'Monsieur Browne,' she went on, leaning a little forward and speaking with still greater earnestness, 'I feel sure you will understand how much all this means not only to her but to me. Since my poor husband's death she has been all I have had to live for, and it cuts my heart in pieces to see her so unhappy.'

'But what would you have me do?' inquired Browne.

'That is the very subject I wished to speak to you about,' madame replied. Then, shaking her head sadly, she continued: 'Ah, Monsieur Browne, you do not know what it is to love, and to love in vain. The favour I am going to ask of you is that you should go away; that you should not let Katherine see you again.'

'But, madame,' said Browne, 'why should I go away? What if I love her as you say she loves me?'

The lady uttered a little cry as if of astonishment.

'If you loved her all would be different,' she cried, clasping her hands together—'so very, very different.'

'Then let it be as different as you please,' cried Browne, springing to his feet. 'For I do love her, and with my whole heart and soul, as I should have told her had she not left London so suddenly the other day.'

Looking back on it now, Browne is obliged to confess that the whole scene was theatrical in the extreme. Madame Bernstein, on hearing the news, behaved with the most amiable eccentricity; she sprang from her chair, and, taking his hand in hers, pressed it to her heart. If her behaviour counted for anything, this would seem to have been the happiest moment of her life. In the middle of it all the sound of a

light footstep reached them from the corridor outside.

'Hush !' said Madame Bernstein, holding up her finger in warning. 'It is Katherine ! I implore you not to tell her that I have said this to you.'

'You may depend upon my not doing so,' Browne answered.

An instant later the girl, whose happiness they appeared to be so anxious to promote, entered the room. Her surprise and confusion at finding Browne there may be better imagined than described. But if the position were embarrassing for her, how much more so was it for Browne ! He stood before her like a schoolboy detected in a fault, and who waits to be told what his punishment will be.

'Monsieur Browne was kind enough to take pity on my loneliness,' said Madame Bernstein, by way of explanation, but with a slight falter in her voice which told the young man that, although she wished him to think otherwise, she really stood in some awe of her companion. 'We have had a most interesting discussion on modern French art. I had no idea that Monsieur Browne was so well acquainted with the subject.'

'It is the one thing of all others in which I take the greatest possible interest,' replied Browne, with corresponding gravity. But he dared not look at Katherine's face, for he knew she was regarding him with a perplexed and somewhat disappointed look, as if she were not quite certain whether he was telling the truth. She did not know how to account for his presence there, and in some vague way it frightened her. It was plain, at any rate, that she placed no sort of reliance in her guardian's somewhat far-fetched explanation.

Seeing that she was likely to be *de trop*, that lady made an excuse and left the room. After she had gone, and the door had closed behind her, things passed from bad to worse with the couple she had left behind. Browne knew exactly what he wanted to say, but he did not know how to say it. Katherine said nothing at all ; she was waiting for him to make the first move.

At last Browne could bear the silence no longer. Advancing towards the girl, he managed to obtain possession of her hands before she became aware of his intention.

Holding them in his, he looked into her face and spoke.

'Katherine,' he said, in a voice that trembled with emotion, 'cannot you guess why I am here ?'

'I understood that you came to see Madame Bernstein,' she faltered, not daring to look up into his face.

'You know as well as I do that, while I made that excuse, it was not my real reason,' he answered. 'Katherine, I came to see you because I have something to say to you which must be said at once, which cannot be delayed any longer.

I would have spoken to you in London had you vouchsafed me an opportunity, but you left so suddenly that I never had the chance of opening my lips. What I want to tell you, Katherine, is that I love you with my whole heart and soul ; God knows I love you better than my life, and I shall love you to the day of my death.'

She uttered a little cry, and endeavoured to withdraw her hands from his grasp, but he would not let them go.

'Surely you must have known all this long since,' he continued with relentless persistence. 'You believe, don't you, that I mean what I say ?'

'I must not hear you,' she answered. 'I cannot bear it. You do not know what you are saying.'

'I know all I want to know,' said Browne ; 'and I think, Katherine, you on your part know how deeply in earnest I am. Try to remember, before you speak, that the whole happiness of my life is at stake.'

'That is exactly why I say that I cannot listen to you,' she answered, still looking away.

'Is my love so distasteful to you, then, that you cannot bear to hear me speak of it ?' he said, a little reproachfully.

'No, no,' she answered ; 'it is not that at all. It is that— But there, I cannot, I must not hear you any further. Please do not say any more about it ; I beg of you to forget that you have ever told me of it.'

'But I *must* say more,' cried Browne. 'I love you, and I cannot and will not live without you. I believe that you love me, Katherine ; upon my honour I do. If so, why should you be so cruel to me ? Will you answer me one question, honestly and straightforwardly ?'

'What is it ?'

'Will you be my wife ?'

'I cannot. It is impossible,' she cried, this time as if her heart were breaking. 'It is useless to say more. Such a thing could never be.'

'But if you love me, it both can and shall be,' replied Browne. 'If you love me, there is nothing that can separate us.'

'There is everything. You do not know how impossible it is.'

'If there is a difficulty I will remove it. It shall cease to exist. Come, Katherine, tell me that you love me.'

She did not reply.

'Will you not confess it ?' he repeated. 'You know what your answer means to me. Say that you do, and nothing shall part us ; I swear it. If you do not, then I give you my word I will go away and never let you see my face again.'

This time she looked up at him with her beautiful eyes full of tears.

'I do love you,' she whispered ; and then added, in a louder voice, 'but what is the use of my saying so, when it can make no difference ?'

'It makes all the difference in the world, darling,' cried Browne, with a triumph in his voice that had not been there a moment before. 'Now that I know you love me, I can act. I am not afraid of anything.' Before she could protest he had taken her in his arms and covered her face with kisses. She struggled to escape, but he was too strong for her. At last he let her go.

'Oh! you do not know what you are doing,' she cried. 'Why will you not listen to me and go away before it is too late? I tell you again and again that you are deluding yourself with false hopes. Come what may, I can never be your wife. It is impossible.'

'Since you have confessed that you love me, we will see about that,' said Browne quietly but determinedly. 'In the meantime, remember that I am your affianced lover. Nothing can alter that. But, hark! if I am not mistaken, I hear Madame Bernstein.'

A moment later the lady in question entered the room. She glanced from one to the other as if to find out whether they had arrived at an understanding. Then Browne advanced and took her hand.

'Madame,' he said, 'I have the honour to inform you that mademoiselle has decided to be my wife.'

'No, no,' cried Katherine, as if in a last entreaty. 'You must not say that. I cannot let you say it.'

Madame Bernstein took in the situation, and adapted herself to it immediately. In her usual manner, she expressed her delight at the arrangement they had come to. There was nothing like love, she averred, in the world.

'I always hoped and prayed that it would be so,' she went on to say. 'It has been my wish for years to see you happily married, Katherine. Now I can feel that my work in life is done, and that I can go down to my grave in peace, knowing that, whatever happens, you will be well protected.'

Could one have looked into her brain, I am inclined to believe it would have been found that, while she gave expression to these beautiful ideas, they were far from being a true record of her feelings. Such sentiments, however, were the proper ones to use at that particular moment, and, having given utterance to them, she felt that she had done all that could reasonably be expected of her.

'With your permission, madame,' said Browne, to whom the idea had only that moment occurred, 'Katherine and I will spend the whole of to-morrow in the country together. I should like to take her to Fontainebleau. As you are aware, there are a

number of pictures there which, according to your own argument, it is only fit and proper I should study in order to perfect myself on the subject of modern French art.'

After this Parthian shot, madame, although she knew that such a proposal was far from being in accordance with the notions of propriety entertained by the parents and guardians of the country in which they were at present domiciled, had no objection to raise. On the contrary, she had her own reasons for not desiring to thwart Browne at the commencement of his engagement, and just when he was likely to prove most useful to her. Accordingly she expressed great delight at the arrangement, and hoped that they would spend a happy day together. Having said this, she wiped away an imaginary tear and heaved a sigh, which, taken in conjunction, were doubtless intended to convey to the young people the impression that she was dwelling on the recollection of similar excursions in which she and the late lamented Bernstein had indulged at a similar period.

'To-night we must all dine together to celebrate the event,' said Browne enthusiastically, taking no notice whatsoever of the good lady's expression of woe. 'Where shall it be?'

Katherine was about to protest, but she caught madame's eye in time, and desisted.

'I am sure we shall be charmed,' returned madame. 'If you will make the arrangements, we will meet you wherever you please.'

'Shall we say the Maison Dorée, then, at eight? Or would you prefer the Café Anglais, or Au Lion d'Or?'

'The Maison Dorée by all means,' said madame, 'and at eight. We will make a point of being there in good time.'

Seeing that it was impossible for him to stay any longer, Browne bade madame good-bye, and went across the room to where Katherine was standing by the window.

'Good-bye,' he said, and as he did so he took her hand.

Looking into her eyes, which were filled with as much love as even he could desire, he put the following question to her, so softly that madame, standing at the other end of the room, could not hear: 'Are you happy, Katherine?'

'Very happy,' she answered in a similar tone. 'But I cannot help feeling that I am doing very wrong.'

'You are doing nothing of the sort,' the young man answered dogmatically. 'You are doing just the very best and wisest thing a woman could do. You must never say such a thing again. Now, *au revoir*, until we meet at eight. I shall count the minutes till then.'

(To be continued.)



THE OPEN-AIR TREATMENT OF CONSUMPTION.

By EUGENE DE TERRASSON.



HE remedies which doctors have suggested for the malady of consumption are, like the charms of Cleopatra, infinite in their variety; but, unlike those charms, time has proved their ephemeral value, for it was not until the discovery of the microbe whose presence is the immediate cause of consumption that scientific and successful treatment of the disease was really initiated. And at the present time this tiny microscopic 'animalcule' forms the cynosure of the physician's eye; he searches for its presence, he strives to render its life a burden, and he uses every means to drive it from the patient's body with inhospitable insistence. It was experimentally discovered that fresh air was regarded by the microbe with the greatest distaste, and that sunlight caused its death; therefore the conclusion was arrived at that the consumptive patient should obtain as much open air as possible, and be exposed to the rays of the sun. What is known of the 'open-air treatment of consumption' has hitherto given the best results both in curing the disease and in prolonging life where complete recovery was impossible; and this method may be summed up in the words, 'rest, abundant food, and a life in the open air.'

The leading principle of this treatment of phthisis is that the patient should spend the whole day in the open air, protected from the weather, and that at night he should sleep with his window open. In recommending this method of cure it is necessary to overcome a prejudice, to subvert the axiom that the consumptive patient is to be rigidly protected from the least cold or draught; that the lungs are to be fed with impure or 're-breathed' air poor in oxygen (the food of these organs), and rich in carbonic acid (which nature has already thrown off), rather than with cold (fresh) air. What a domestic earthquake would entomb the doctor who had the temerity to suggest to the relatives that the consumptive, suffering from high fever and inflammation of the lungs, should be wrapped up and taken into the open air! Could any greater collision with traditional treatment, with the *obiter dicta* of family physicians from time immemorial, be imagined? Could any more homicidal advice be conceived? And yet this plan is followed in the 'open-air treatment' with conspicuous success.

It is difficult to persuade the patient that, as his disease has not been caused by cold, therefore warmth will not cure it. That cherished abomination the 'chest-protector' is a fetich which it is almost impossible to destroy, especially among the

lower working-classes. We have known many cases where the flannel shield has been the constant and intimate companion of the sufferer for years, where its divorce from the patient's person is a matter of tearing and pulling and ripping and undoing that occupies several minutes, so securely is it fastened. Its destruction is followed by much regret and great hygienic advantage to the quondam possessor. It is obvious that the correction of these and other prejudices founded on a wrong notion of the origin of consumption would, in the majority of cases, be carried out with difficulty in private residences, and the method of treatment is therefore generally practised in sanatoria, where there is done for the invalid that which he has not the means, the opportunity, or the strength of mind to do for himself. We know from incontrovertible medical evidence that consumption in the earlier stages is eminently curable, and it is for this class of patient that the 'open-air treatment' is specially valuable.

The doctrine that consumption has been and can be cured by a residence in the open air is by no means new. Indeed, many diseases which owe their origin to discovered microbes have proved, frequently by accidental experiment, to have been markedly benefited by treatment carried out exposed to the four winds of heaven. Sometimes a consumptive has left his couch in the African veldt; hunting by day and sleeping in the ox-wagons by night, he has almost imperceptibly thrown off his fearful incubus. At other times, in crossing the Pacific, the patient has given his disease such intoxicating draughts of ocean-air that, like Sindbad's Old Man of the Sea, it has relaxed its grip, and left him to proceed to the antipodes in peace, and with a renovated constitution. In connection with other diseases it may be mentioned that in 1854 a portion of the patients in the Austrian camp were treated in tents instead of in permanent hospitals. The results were very satisfactory. 'The most severe maladies ran their course much more mildly in the fresh air.' Tholozan reports of the Crimean war that, 'at Sebastopol, in spite of bad nourishment, and living in tents in rain and snow, out of 1200 sick scarcely any were phthisical' (consumptive).

The question naturally arises, To what peculiar properties are these beneficial results of fresh air to be attributed? According to Dr Ransome, there are several factors in operation. In the first place, it should be remembered that 're-breathed' or impure air, which, like tainted food, is bad for healthy individuals, is specially deleterious to consumptive people, whose lungs require the best

nourishment they can obtain—that is, the purest air. Further, the consumptive's lungs contain innumerable poisonous germs which indirectly set up serious constitutional mischief—such as fever—and which should therefore be got rid of at the earliest opportunity. Health demands that a minimum of 3000 cubic feet of fresh air should flow over a person in one hour; but in the open air, on an average, 324,000 cubic feet flow over an individual per hour. The scavenging power of this current must be enormous. Poisonous germs are continuously exhaled by the patient; but they are swept away, and fresh air is inspired; there is a constant ventilation of the lungs proceeding, with the best possible results. And the speedy diminution of the hectic fever which consumptives suffer from, and which is due to these poisonous germs, is thus largely accounted for. The fresh air, in conjunction with sunshine, acts antiseptically upon the bodies and clothing of the patients, still further purifying the air which enters the respiratory organs. Further, there is more active oxygen, or ozone, in the open atmosphere than in the air of dwelling-rooms, and this, while exercising a health-giving action on the structures of the body, destroys many poisonous germs. Lastly, sunlight itself is the sworn enemy of the microbe, especially that of consumption; and, exposed to the solar rays, this little germ, which inhabits the lungs of the consumptive in millions, and under the microscope presents the appearance of a 'rod'—for its structure, as it were, typifies its mission of chastening mankind—shrivels up, loses its lethal power, and ceases to exist.

Recognising these facts, a Continental physician, Dr Brehmer, proposed some years ago the 'open-air treatment' of consumption; but he believed that, for its effective engineering, patients would have to be content to resign their liberty into the hands of the doctor, and to submit to such rules of life as might be prescribed. At his own expense he established an institution at Goebersdorf, in Silesia, and the success he has met with has given rise to similar enterprises in different parts of the Continent and America, and, comparatively recently, to efforts on a smaller scale in the United Kingdom.

There are minute differences in detail at the various sanatoria, more particularly in the matters of food, exercise, and amusement; but the ensuing description of the method in which the system is carried out—although approximately characteristic of all—most nearly resembles that in vogue at Nordach in the Black Forest.

The pilgrim, arrived at the particular shrine of Hygeia which has been selected, may realise at once that the goddess has indeed enticed her worshippers from the world, for her temple is perhaps situated at the end of a remote valley densely clothed with pine-trees—ten miles from a station, and fifteen miles from the nearest town.

Streams probably descend the hillside in all directions, and the moist, aromatic, dust-free atmosphere acts like a sedative balm on the irritable lungs of the sufferer, soothing his cough, allaying the pains in his chest, and inducing a health-giving sleep. In withdrawing him from his surroundings one of the primary objects of treatment is effected—mental rest; and, as if he were in a second Land of Beulah, 'where the sun shineth night and day,' he is able from sunrise to sunrise to breathe the pure open air of heaven uncontaminated by dust, by respiration, or by other impurities. The visits of friends, although not forbidden, are distinctly discouraged, and it is an easy matter to imagine that well-meaning relatives might by their presence produce a state of mind the reverse of calm in an already irritable patient, and at the same time handicap the director who is enforcing a treatment at first sight somewhat drastic.

The houses of which the Nordach Sanatorium is composed are built of wood, or of stone which has an inner lining of wood in all the rooms. Wall-papers and carpet are repudiated as possible harbingers of those enemies of the consumptive—dust, dirt, and microbes. In the almost monastic simplicity of the rooms, cornices, projections, recesses, 'cosy corners' (much affected by microbes), ornamental dados, and other reminiscences of Vanity Fair are conspicuously absent, wherever possible to avoid them. The corners of the apartments are, in some sanatoria, completely filled in, lest dust and germs, like Puck in a gossip's bowl, should lurk there. The prevailing idea is not to provide resting-places for organisms which would vitiate the atmosphere of the chamber. There are many more microbes of consumption and other diseases in the sleeping-room of a house in Edinburgh or London than in one of these homes for the victims of phthisis. The floors and walls are not swept, but daily wiped down (to prevent raising dust) with a damp cloth impregnated with some disinfectant. The expectoration of patients—which is the principal source of diffusion of the microbes—is disposed of with elaborate and quite justifiable precautions, and the personal rules are very stringent on this point. Electric light is employed, thus preserving the air from the impurities of gas, and the heating is done as a rule by hot-water pipes. The dining-hall is closed by the end walls only, and the long sides are open to the air. During the winter a partial glazing-in of these sides is effected. The window space in each bedroom is very large, and the windows are never shut. The patient spends his day, winter and summer, in the open air, and if he is too ill to walk about he is carried out on a couch, and deposited in one of the specially constructed verandas (*liegenhalle*), where he finds other patients reclining in various stages of convalescence. These structures, raised two or three feet from the level of the ground and closed at

each end, are placed facing the south or south-west; they are from seven to ten feet wide or even more, to allow of the needful space for reclining-chairs. The drifting rain, the snow, and high winds are kept out by curtains, and the too intense heat of the sun by blinds. When the weather is suitable and the invalids are in a fit condition, they are allowed to sit out in the open. In the *liegenhalle* the patients lie from seven to eleven hours a day, only moving away for meals and exercise.

The invalids are under the direct supervision of a resident doctor, who doles out open air, exercise, and food in accurate doses, which are correlated to the exact constitutional condition of each individual. The treatment of the patient is largely determined by the amount of fever present—in other words, by his temperature; and he therefore takes his own temperature four times daily, and marks its progress on a chart. The physician gradually acclimatises the most delicate and fragile until they can stand frost and wet, reclining in the verandas. At first there may be complaints of cold and discomfort, especially in inclement weather. The director is summoned, and the complainant—usually an Englishman or an American—runs through a gamut of woes, of which ‘confoundedly cold’ is the fundamental note. The director politely sends for more wraps; but the windows remain inexorably open. Also, it is occasionally found that a patient resents the quasi-military discipline of the institution. One medical director remarks of these disaffected subjects: ‘I leave them to their own devices for a few days, and they very soon come to me, and promise to be good, and to follow the example of the other patients.’ If the weather is cold the invalids are encouraged to lie prone, as in that position the low temperature of the air is more easily endured. A visitor to Dr Turban’s sanatorium at Davos, when there was thick snow on the ground—the temperature being four degrees below zero—was surprised to find patients clothed in furs lying out in the *liegenhalle* after sunset, reading by electric light or playing chess and draughts; their hands and feet were found to be perfectly warm in spite of the frigidity of the atmosphere. The life of reclining in the open air hardens the invalid against fresh cold, excites the appetite, reduces ‘night-sweat’—so distressing an accompaniment of consumption—procures sleep, and reduces fever.

The feeding is another item in the treatment, which is graduated by a system of dosage or, in certain cases, as will be seen, overdosage.

At some sanatoria the patient is merely encouraged to eat as much as he can manage; at others it is one of the rules of the institution that he eat double what he feels inclined to! The excellent results of overfeeding appear the more extraordinary when we consider the feeble digestion of the majority of cases of phthisis. At

Nordach the maximum amount of food is not administered until after the lapse of the first few days. Then the doctor takes up a convenient position at each meal, and watches that the following liberal menus are partaken of:—*Breakfast*: Half-litre of milk, coffee and rolls, eggs and meat, as the patient likes. This is the only meal at which one can suit one’s inclinations. *Dinner* at 1.15: Half-litre of milk. First course, about half-pound of beef or fish; second course, about half-pound of veal, mutton, or poultry; as much vegetables as can be crowded into two platefuls; half-pound bread, half-pound pudding, rice, batter, custard, or ice-cream. *Supper* at 7: Same quantity as dinner, without pudding, and the courses are as varied as possible.

These two meals have to be taken under the eye of the doctor, and no servant is allowed to remove a plate until quite empty. Alcohol is allowed (as beer or wine). A half-litre of milk is nearly a pint.

The results of these feasts, which, it will be observed, are the reverse of Barmecide, are various; the ultimate effects are highly favourable, but the immediate consequences are, on occasion, disagreeable. In order to point out the great importance which is attached to heroic overfeeding, it is necessary to state that, in the exceptional event of vomiting occurring, the patient, in certain sanatoria, is made to come back to the table and begin the meal all over again. In the more lenient institutions he is graciously allowed to resume the meal at the point where it was punctuated by his retirement. This procedure is not so incomprehensible when we recollect that in the sickness, which so frequently adds another burden to the already grievously afflicted victim of advanced consumption, the administration of nourishment immediately after the nausea has ceased is not followed by its rejection. But the patient speedily becomes reconciled to the process of ‘stuffing’ when he finds that his weight is going up by leaps and bounds, and when he discovers that he has gained three, four, even five pounds the first week, and after one month two pounds every week.

When the temperature and weight are satisfactory to the medical autocrat, exercise is entered upon, and, like everything else in these semi-Utopian establishments, in a system of doses. While the patient lies in bed in the morning he is told how far he may walk, which for the first week is not more than four hundred or five hundred yards. To perform this pedestrian feat he is allowed three hours—two hours out and one hour to return; the invalid progresses at a snail’s pace, one foot being slowly swung in front of the other, so that the least possible strain is thrown upon heart and lungs. Great benefit is speedily felt, and the walk, which is taken in all weathers, is gradually increased in length until miles are accomplished. Forced breathing or ‘lung gymnastics’ are carried on in some establishments as

follows: During steady walking, five or six deep breaths are taken through the nose every hundred or one hundred and fifty paces; or, when lying in the open air, ten or twelve deep breaths every five or ten minutes (Dettweiler). There is in certain cases a walk constructed for the weaker ones, and especially those with heart disease, in which a slight ascent is first encountered, then a portion of level ground, and lastly a descent home. The patients are invariably encouraged to go slowly, to avoid talking, to breathe through the nose, and to stop short of actual fatigue. By the foregoing process the weak and diseased lungs are treated like the muscles of a sick man venturing into the air after a debilitating illness; the tone of the pulmonary organs is improved by the exercise, and every portion of the lungs is, like the patient's apartments, swept and garnished by the scavenging air, so that no holes and corners may remain where the microbes may form fresh centres of infection and mischief.

Even the unruly cough of the consumptive is subject to a species of disciplinary repression. A visitor at one of the German sanatoria, who happened to be present in the dining-hall when the principal meal was in progress, noticed that scarcely a single cough was heard from beginning to end of a protracted sitting, although the room was filled with people in various stages of consumption. On interrogating the director of the institution as to what measures were undertaken to bring about this happy state of things, the physician replied that he was obliged to appeal individually to the patient's aesthetic sense, to his appreciation of *les convenances*. It was his custom to explain that nature provided the cough for the purpose of clearing the bronchial tubes of material that had collected there. This effected, the cough was no longer a justifiable act; further, it was an offence against society—an impoliteness; for it proclaimed to all and sundry that your throat was tickling and itching, and that you were engaged in scratching it. 'Do you not,' he asks, 'restrain a desire to scratch your skin in public, even if it itch ever so?' The patient, as a result of these admonitions, when he feels the impulse to cough coming on, concentrates his will on the inhibition of this feeling; the sensation then usually passes away, and the less he coughs the less he feels inclined to cough, and hence the edifying absence of the symptom.

In all the establishments the patient is under the personal supervision of the doctor, who orders every detail of his life, enforces his rules, visits him two or three times a day, and induces the invalid to make of the sanatorium, in Dettweiler's words, 'his religion, his politics, his despair, and his delight.'

It has been proved that climate is by no means an all-important factor in the 'open-air treatment,' and therefore, although our variable English weather is not an ideal one for the purpose, there is no

reason why sanatoria might not be erected in certain suitable parts of the United Kingdom. As far as we are aware, there is as yet only one institution of this description for the gratuitous treatment of consumption, and that is in Edinburgh.

The results of the 'open-air treatment' are the most favourable of any special method of dealing with consumption. We have not heard of an untoward accident as a result of the methods adopted, in spite of the bold and apparently reckless manner in which individuals who, according to all preconceived ideas, should be considered the exotics of the community are exposed to all varieties of cold and damp. It is true they are suitably shod and mantled, that the lambs shorn of resistive power are not exposed at once to the untamed winds in the same manner as the bell-wethers of the flock who have almost recovered their health, and that they are all continually under the close supervision of mature medical experience.

Very quickly remarkable changes occur in the patient as a result of treatment. A more healthy appearance is substituted for the wax-like and unhealthy complexion of the invalid; appetite returns; 'night-sweats' lessen and finally vanish; the cough lessens; the fever diminishes; body-weight and general condition improve with marvellous rapidity. The course of treatment is, on the whole, decidedly pleasant, and those in a position to judge say that the termination of the patient's sojourn is to him a black-letter day indeed.

Before dismissing a patient it is ascertained beyond doubt, by certain scientific tests, that he has for the time, at any rate, cast off the slough of disease.

Certain objections have been raised to the method of treatment. It is stated that the segregation of a number of consumptive individuals may form 'centres of infection' by means of which the germs of the disease may be conveyed to the neighbouring healthy; but inasmuch as our town hospitals for consumption have not been shown to spread the malady, it is still less likely that sanatoria situated in the breezy open country would have this undesirable effect; for here the microbes, under the influence of chemical disinfectants, of sunlight, of fresh air, and of ventilation, are speedily destroyed and swept away. Another objection, of more importance, is that the sufferers are exposed to the depressing influence of the presence of many invalids crowded together. It is certainly a matter of astonishment and congratulation that the directors of the sanatoria are able to infuse a spirit of cheerfulness into their patients. But the rapid amelioration which usually occurs, the returning vigour, the consciousness of the gradual ability to fend off the lashes of a cruel scourge, amply suffice to nullify any elements of gloom in the surroundings of the consumptive

who is fighting his way back to health armed with that intangible Excalibur—fresh, pure air.

Every intelligent reader will wish the newly formed National Association for the Prevention of Consumption success, as it aims at carrying into every dwelling in the land an elementary

knowledge of the modes in which consumption is propagated, and of the means by which its spread may be prevented. For, from what we have already seen, we have been hitherto behind the Continent in our efforts to extirpate the fell disease.

FROM THE JAWS OF DEATH.

A TALE OF SIBERIA.



ATTACHED to my watch chain there is a common brass stud, which, like the deep scar on my left cheek, has naturally more than once aroused the curiosity of my friends; and to satisfy them I have oftentimes related the eventful history of this little piece of brass. This indented, defaced stud is precious to me, as it is the relic of a dear and trusty friend. On many a quiet evening, while enjoying the ease of the arm-chair, with my pipe as sole companion, I watch dreamily the fragrant smoke as it curls to the roof, and muse over that eventful night. Strange and eerie thoughts arise in my mind—thoughts which recall that awful experience in which this little nail of brass came to merit the honourable position which it now holds.

It was once in the collar of a brave and faithful dog, a large boarhound—'Caesar'—as fine a specimen of that noble breed of dogs as one could find. Built like a young lion, he possessed, like all dogs of the same race, the agility of the greyhound, combined with the determination and pluck of the bull-dog; yet he was as gentle as a lamb when no danger was ahead. Once, when in the wilds of Norway, near the peak of Snachatten, in the Dovrefield Highlands, prospecting for copper ore, he was the means of saving my life. We were belated on the mountains, having wandered too far off the beaten track; and had I not been protected from the bitter night-frost by sleeping close to his warm shaggy coat, I would certainly have perished.

But this other experience which I now give my readers cost the dear fellow his life, and very nearly my own. It was in the winter of 1891, and I happened to be in Russia at the time, away far up at Yenitusk, a small village about five hundred and fifty miles north of Tomsk, in Western Siberia. I was commissioned to this outlandish place in order to make the necessary arrangements for sinking a mine where the valuable minerals silver and platinum were to be found in considerable quantity. Yenitusk is but a village of some three hundred inhabitants, consisting mostly of timber-workers, trappers, and peasants, or *Moujiks*.

As there was every prospect of my stay being prolonged for a considerable period, I took with

me my faithful companion 'Caesar.' Later on I got sent out, among a few other things, my bicycle, a rather old-fashioned solid, cushioned machine. Except around the larger cities, the roads in Russia are merely great cart-ruts, over which the vehicle lurches and jolts in an indescribable manner, sometimes taking as many as three or four horses to draw a light load. As soon as the winter sets in and the ground gets covered with snow to a depth of two or two and a half feet, all irregularities are obliterated, and the landscape to the north of Yenitusk presents a great white undulating plain, with here and there rising grounds crowned with clumps of dark pine-trees. If after a slight thaw there follows a keen, severe frost, as often happens in Russia, the surface of the snow becomes as hard as a crust of metal, and able to sustain a good amount of traffic. This snow-surface sometimes possesses a peculiar roughness or 'bite' which enables the cyclist to ride as smoothly as on a cement pavement. One can easily understand what delicious riding means under such favourable circumstances. Such was the pleasant state of affairs one evening as I sat before the blazing log-fire in my comfortable little rooms in Yenitusk, reading some magazines from home, which, though sadly clipped and ink-obliterated by the government officials, had, in their tattered guise, been allowed to reach me. Looking out into the clear moonlight, the landscape, in its cold whiteness, stretched away as far as the eye could travel. In the heavens above the stars scintillated with unusual brilliancy. What a glorious night!—so silent; not a sound to be heard except the occasional baying of some of the village dogs. 'What a splendid night for a ride!' I exclaimed, half-aloud. Caesar, who had been lying stretched to his fullest below the heavy rough wooden table, lifted his massive head and looked towards me, as if to say, 'Well, master, if you like, I am ready.' I had often been out before, but never on such a night; so I prepared for a moonlight spin. My long cravat I wound round and round my throat, then over my mouth and nose, to protect them from the bitter cold. My hands were protected in a pair of warm fur gloves. Thus equipped, I stood thinking for an instant what else was required. My revolver! Should I take it or not? I had always carried

it before, and never needed it. I had often heard from my landlady's husband—a trapper—how, about a year ago, a pack of wolves had attacked a bear a few miles from Yenitusk; the bear coming off victorious after leaving four dead wolves and a good deal of its own fur behind. 'Well, I'll be safer with it,' I murmured to myself; 'I may have a flying shot at the small game—the squirrels, weasels, ermine, and others that inhabit the place.' After filling all the chambers, the revolver was pushed carelessly into the waist-belt. Summoning my landlady, I informed her, in German, as she understood that language and I knew no Russian, that I would be home before very late, and to add a few pine-logs to my fire. After a pleasant '*Guten-Abend*,' I was gliding noiselessly through the silent moonlit village, with Caesar trotting ahead of me at a good swinging pace. How glorious was the night! How delicious the ride! The snow was in perfect condition, and the stars twinkled merrily overhead. Flying through the keen air soon froze the moisture from my breath, so that the scarf across my mouth and nostrils became frozen and covered with ice-particles. I will never forget the delightful feeling of freedom as we sped mile after mile across the white snow in the still moonlight. It brought back to my mind the lines in Keats's '*Eve of St Agnes*,' learned when a youth at school:

St Agnes' Eve. Ah! bitter chill it was.

The owl, for all his feathers, was a-cold;

The hare limped trembling through the frozen grass;

And silent was the flock in woolly fold.

We now began to enter a kind of avenue, or narrow pass between two rising knolls. The banks on either side were overgrown with thick brushwood, while crowning the knolls were dense patches of fir-trees. Slowing up I peered into the pitchy darkness of the wood, but the eye could discern nothing; the stillness was oppressive. Only now and then the rustling of a rabbit or squirrel among the dry, crisp brushwood could be heard, as it nibbled its scanty supper from the bark of the twigs. With a joyous heart I sang aloud, making the silent woods echo, and once more I shot away as on the wings of the wind. My ears tingled with the cold. On emerging from this gloomy avenue what a glorious view lay before me! We were now on a rising ground, and there below us, stretching away far in the distance, seemed a limitless plain; while a little to the left, like the fringes of a vast pall, lay the silent forest, looking so black and gloomy in the pale moonlight. Caesar was far on in advance, running with his nose on the ground, evidently on the trail of some animal.

We were now fully thirty miles from Yenitusk and drifting farther and farther into the wilderness. After having the delightful experience of flying down a long decline, with my feet on the rests, I decided to take a wide curve and turn my face homewards. In doing so the bicycle

gave a bump as if dropping into a cart-rut. Having experienced the same sensation once or twice during the evening, my curiosity was aroused; and, after dismounting, I examined the spot. It was a bear's track. Stretching away across the snow, like the dots on a great map, lay the foot-prints of the heavy beast. From the direction of the paw, it was evident he had made his way to the forest. Before remounting I stood overawed with the deep solemnity of the scene. The stars twinkled; a death-stillness reigned. Only those who have experienced being alone at midnight on the wide sea or in the desert can understand the solemnising effect it had on my spirit. But hark! what strange sound was that? I turned my ear to listen. Ah! there it is again. In an instant I could distinctly hear a jangling, discordant sound of short yelps and howls—a sound which, when once heard, can never be forgotten. A pain darted across my heart, my breath came in gasps, as the thought flashed upon me: 'Wolves! Can it be possible?' While standing for the moment petrified with horror, I could plainly see, issuing from the skirts of the great forest to the left, a number of black objects, one after another. Their fiendish chorus of howls now came clear and distinct; they were after us. Caesar watched, with startled look, the pack of moving objects, and, with cocked ears and bristling mane, gave a few deep, ominous growls. Wolves, and thirty miles from human help! O God! I knew it must be a race for life. But I was young and strong. My limbs were hardened with exercise; I determined to give the brutes a hard race. With a trembling hand I patted Caesar's rough neck in an encouraging manner; though, to tell the truth, it was I who received encouragement on finding the bristles of his neck stiff and his whole frame rigid as iron.

'Never fear, Caesar, my lad,' I muttered in tones thick from fear; 'let me see you do your best.' He was my only friend; my life depended upon his; and nobly, poor fellow, he stuck by me to the very last.

Mounting in an instant, I rode with such feelings as I never before experienced. Fear lends us wings, and we soon found ourselves ahead of our enemies. The long, delightful decline of half-an-hour ago was now a steep hill, and a terror to me. I determined to keep up the distance between our enemies, but I could plainly see that the brutes were gaining on us. Strange thoughts kept running through my brain—thoughts of a dear old home in Scotland, where dear faces were waiting for me; every one I loved passed before me, and such visions nerved me to the utmost. Glancing occasionally round my shoulder, I could distinguish in the moonlight a string of black animals following us tirelessly, while their fiendish yelps and howls chilled my very blood. Would my flesh be torn by these cruel fangs? Would I ever feel their horrid breath against my face, or look

into those horrid, cruel, green eyes? 'O God! help me,' I muttered between my tightened lips. It was so hard to die away from human help, and in such a manner. My path now lay round a knoll of pine-trees on the rising ground. I strained every nerve to get the advantage of those cunning brutes; but, alas! with a sinking heart, I could plainly see the wolves were making to cross the knoll and cut off my escape at the other side. I could see them distinctly, fully half-a-dozen lean, hungry-looking brutes, like ill-fed collie dogs, all making towards the slope and entering into the dark wood. I felt my life now hung in the balance. Faithful Caesar was running alongside of me, panting heavily, poor brute. I could feel the beads of sweat trickle down my cheeks. Would we round the knoll before the wolves got through it? If so, then we had a fair chance; if not, what then? A few pistol-shots, a savage snarl and snap, a hungry wolf upon my breast, a tumble, and a dozen foaming fangs tearing me at once. All would soon be ended. I felt as in a horrible dream. Never before had I breathed so fervent a prayer for Heaven's help. But, ah! how silent were the heavens! The moon shone as quietly as before; the stars twinkled as before. I strained every muscle, and already felt the thick cravat like to choke me. My life depended upon a few minutes—the suspense was terrible. I rounded the knoll breathless, but felt an inexpressible thrill of thankfulness and joy as I saw all was clear before us. We were first. Caesar, poor fellow, was beginning to lag behind. I was sorry for him, and cried some words of encouragement, which he answered with a whining yelp; but he kept on bravely. Scarcely had we got clear of the knoll when the brushwood crashed, and the horrid howls of the wolves, as they issued from the wood, reached my ears. They had been cheated of their prey, and were now more savage than ever.

How long was this terrible nightmare going to last? We made the best of our advantage. Having now reached the top of the rising ground, we widened the distance between our pursuers. We were now ten miles from the village of Yeniutsk. How I yearned to reach the first hut on the outskirts, after which the wolves would probably slink off. But our escape had disappointed them, and they would no doubt pursue us to the very last, as they had done about two years ago to a horse-sleigh. There was yet one more grand effort to be made, and all would be either lost or won. About five miles from the outskirts of the village my path lay for about half a mile between two knolls of trees, with banks sloping steeply upwards on either side. Would we be successful this time and be before them, or would the wolves learn from their last failure and cut through the patch of trees at a better angle and thus entrap us? As we approached the dark avenue between the steep banks, through which, but a short time

ago, I had sung so lustily in the jollity of my heart, I felt a cold dread creep over me, as if I were riding to my tomb. I must prepare myself for the worst. Freeing my right hand, I felt nervously for my revolver, and fired one shot before me to frighten the beasts. How loud the crack reverberated through that solemn stillness!—a stillness which seemed only broken by the thumping of my heart and my own panting. I, too, could hear Caesar pant heavily behind me; but somehow the loud crack of the revolver broke the oppressive and death-like suspense. I gained fresh courage and confidence in myself, and seemed to gain a firmer hold of life. I strained every nerve; the bicycle, old machine as it was, behaved splendidly. Crash! crash! went the brushwood up the bank a little in front of me. A fierce, savage yelp told me that we were hemmed in at last. In an instant three large wolves shot down the bank a few yards in front of me. I fired—the foremost turned a somersault in the snow. I fired again, but missed.

I glanced behind me, and saw a deadly battle waging between Caesar and a large wolf. I seemed to slip my right foot all of a sudden, and, to my dismay, I found the pedal had worked loose and dropped off. My last hope was now gone. The sinews of my legs seemed already like to crack. I saw the final scene was drawing near. A gaunt brute, with eyeballs gleaming with a horrid greenish fire, sprang at me from the bank. As I rode past I heard his jaws snap together like a steel trap. In a few moments he was again in front of me. He made another spring. I fired, but too late. His skull came into collision with my hand, and directed the bullet skywards. I felt his horrid breath in my face; his gleaming, fiendish eyes stared into mine, and in an instant we rolled over together in the snow. A cold shiver still runs through me as I think of that awful moment. We were both somewhat stunned. I staggered to my feet; the heavens seemed ablaze with fireworks. Moon and stars wheeled round and round, while a loud noise as of a cataract sounded in my ears. Luckily I happened to be uppermost in the fall; otherwise I could not tell my tale. The wolf was below the bicycle; and my weight, combined with the shock of the fall, stunned him for a few seconds. My revolver—it was gone! The next instant the brute was up and at me with snarling jaws, his white fangs gleaming in the pale moonlight. Caesar, poor fellow, had done valiant service, but he was sadly maimed. The blood-marks followed him on the snow. It was a stand-up fight with death. I found this could not last, and my end was drawing near. As the wolf made another attack my boot caught him heavily on the under jaw, which helped to keep him at bay a little longer. My heart sank within me as I heard a horrid exulting howl, and saw another wolf rush down the bank towards me. Caesar flew at the one, while the

other sprang upon my breast and tried to reach my throat. Luckily my thick cravat protected me, and we fell together in the snow. Desperation gave me almost superhuman strength. I clutched his shaggy breast and tried to hold him at arm's-length, but his claws tore me frightfully. It was then I received that deep scar upon my cheek which I will carry to my grave. How long this battle lasted I cannot tell. It seemed years. I felt a strange dreamy sensation stealing over me, and gradually I must have swooned away.

When I came to my senses I found myself wrapped up in bed in my little room in Yenitsk, with the landlady—kind soul that she was—bending over me and bathing my face. I lay in bed with fever for many days, and the memory of that awful night haunted my mind. For some five weeks I was confined to bed 'in daily doubt whether to die or live;' but with careful nursing

I managed to pull through. A few scars remain behind, reminding me that my moonlight experience was no nightmare, but a stern and terrible reality. The villagers heard the pistol-shots and the howling of the wolves, and turned out with lanterns and weapons to my assistance. They had arrived not a moment too soon. I was found lying bleeding and insensible in the snow, with the body of a dead wolf beside me. Caesar had evidently come to my rescue, and finished my last antagonist. The villagers carried Caesar home; but he died, poor fellow, the next day from his wounds. How I would have liked just to have patted him for the last time, or held his head during his last moments! No doubt, poor dog, he missed me. The only relic we could find of him was a remnant of his leather collar, in which there still remained *one small brass stud*. This was found on the very spot where the two of us had fought so bravely for our lives.

THE MONTH: SCIENCE AND ARTS.

A NEW USE FOR SAWDUST.



HERE are few waste products now, for human ingenuity finds a use for most things. Sawdust, the accumulation of which in certain trades was at one time regarded as a nuisance, is now turned to many useful purposes; but certainly few would have anticipated that it would ever be employed for the production of alcohol. Yet it is a fact that works are now in progress for the manufacture of the potent spirit from sawdust. The process has been worked out by E. Simonsen, a Dane; and the method consists in treating the sawdust with dilute acid under pressure, by which the lignin is converted into sugar; fermentation with yeast follows, and alcohol is the result. Fuller particulars may be found in the *Journal of the Society of Chemical Industry* for 1898, pp. 365-481.

NEW TYPE OF ORGAN.

The organ has long been known as the king of musical instruments; and although many improvements have naturally been introduced into its manufacture since the time of Father Smith, in general structural arrangements it remains much as it did in the day of that grand old builder. A new system has, however, been recently introduced in America, which represents a wide departure from the old method in vogue in Europe. Messrs Austin Brothers of Detroit are the patentees of this novel system, which is said to possess many advantages. In the old method of building, separate bellows furnish wind by means of wind-trunks to a wind-chest, upon which the pipes are arranged, the air finding access to them through

channels closed with pallets which are controlled by the keys beneath the organist's fingers. In the new organ, bellows and wind-chest form one huge reservoir, and at the same time part of the framework of the instrument. The wind-supply to all the pipes is direct from this chest, without the intervention of channels or wind-trunks. A large organ built on this principle, and erected at Hartford, Connecticut, was opened at the close of the past year. A similar instrument, built specially for inspection in this country, has been erected at Knuston Lodge, Ilchester, Wellingborough.

THE PANAMA CANAL.

According to the *Washington Post*, we are some of us still destined to see the Panama Isthmus cut through, and a great canal established between the Atlantic and the Pacific Oceans. Although little is said about it, the work now in progress is on such a scale of magnitude that the enterprise is bound to come to a successful issue. Four thousand men are employed in a business-like and scientific manner, which, if it had been pursued in the early days of the operations, would long ago have opened the isthmus to the traffic of the world. The Canal Company owns the railway which traverses the little neck of land—forty-seven miles in breadth—that ties together the two Americas; and this railway naturally is of great service in the prosecution of the work.

MISCHIEVOUS ELECTRIC CURRENTS.

Electrical action is sometimes set up in quarters where it is not only not desired but is prejudicial. A curious case of this kind recently occurred at the port of Leghorn, and was fought out in the Italian law courts. It seems that certain wooden

yachts with coppered bottoms were anchored in the Darsena harbour of Leghorn, not far from various new warships and other iron and steel vessels. It was found that the copper vessels, aided by the steel ropes which found a common centre in the buoys to which they were attached, set up galvanic action, which had a most serious and corrosive effect upon the steel and iron ships; and the captain of the port, therefore, became nominal plaintiff in an action at law to compel the owners of the copper-bottomed vessels to remove their craft from the harbour. The fact of material damage was proved to the satisfaction of the court, and the owner of the smaller vessels had to remove his property elsewhere.

A TRAVELLING EXHIBITION.

A novel commercial experiment is about to be tried by certain Austria-Hungarian manufacturers, backed by the support of their government. A large steamship is to be fitted out as an exhibition, and is to call at different foreign ports, the stay at each being in duration regulated by the importance of the place. The ship will carry a number of experts, each one of whom will represent so many manufacturers of one class of goods, and to these men will fall the duty of explaining to visitors the merits of the manufactures, and they will also be prepared to take orders for them. To obtain good linguists versed in the intricacies of the different industries would seem to us to be the most difficult part of the enterprise; but no doubt its promoters see their way to solve this problem. The arrival of the floating exhibition at each port will be extensively advertised, and the scheme will doubtless receive the attention of many buyers, if only on account of its novelty, or the desire to see whether the idea is worthy of imitation.

JOYE'S THUNDERBOLTS.

Many aerial observers attached to the U.S.A. Weather Bureau have recently been unwittingly repeating Franklin's historic kite experiment of 1752, with very startling effects; but, whereas the original experiment was conducted with a mere toy kite, the modern workers are employing for their researches huge machines, held by ten or twelve thousand feet of steel wire; for the primary use of these kites is to carry to high altitudes meteorological instruments whose duty it is to make records of the state of the upper regions of the atmosphere. On the finest days sparks can be drawn from the sky by means of these kite-wires; but it is when a storm approaches that things become serious for the operator engaged. One of these gentlemen reports that when he had seven thousand five hundred feet of wire reeled out he heard distant thunder, and immediately began to turn the winch which hauled in the wire. Suddenly came a flash which fused the wire; he saw a rope of smoke stretching away in its place, and he was for a moment

stunned. Another observer had a similar experience when he had only five thousand feet of line out; in this case, too, the wire was suddenly fused and the kite set free, the phenomenon being accompanied by an explosion which caused people to think that guns had been let off. These are by no means singular experiences, and the Weather Bureau authorities see no way to get over the difficulty except by the avoidance of observations on uncertain days.

A NEW FIRE EXTINGUISHER.

The great value of an efficient means of coping with an outbreak of fire at its initial stage is acknowledged by all; and any contrivance which is serviceable in securing this end is worthy of attention. The extinguisher recently invented by Dr A. M. Ring, of Arlington Heights, Massachusetts, provides a means of generating a quantity of carbonic acid gas (carbon dioxide), which is known to be a foe to combustion; and this gas, dissolved in water, is squirted upon the incipient conflagration by its own pressure. The apparatus consists of a tank holding several gallons of a solution of soda bicarbonate. On a kind of shelf above the liquid stands a bottle of sulphuric acid, which can be easily broken by the action of a lever outside the receptacle. A tube and nozzle for discharging the liquid in any required direction completes the arrangement.

PAPYRISTITE.

This is a new artificial stone-like substance, which is highly spoken of in one of the U.S. Consular Reports, and which is being manufactured at Zurich. The principal constituent of this substance is purified pulp obtained from waste-paper; hence its name. The material is supplied in powdered form, and is packed like cement in barrels or sacks; mixed with water, it can be spread like cement, will harden in twenty-four hours, and is then unsceptible of receiving a high polish, if such treatment should be required. Papyristite can be cut, sawn, or bored; it is as hard as marble; it can be given any tint desired; it is adapted to all temperatures; and it is light, elastic, and inexpensive. It is non-absorbent of moisture or any filthy or obnoxious matter, and is not liable to the attacks of insects, mice, or rats. Samples of the material in a finished state, or of the raw ingredients, will be furnished by the inventor, provided that applicants will pay cost of carriage. For these and other particulars application should be made to the Papyristic Company, Post Fach 10,469, Zurich, Switzerland.

DUMMY BULLETS.

Many are the stories which are told of dishonest contractors who in the past have supplied our troops with food and articles of clothing which have turned out to be worthless at a time when the soldiers stood most in need of creature

comforts. But times have changed with us, and under present conditions such pitiful cheating would be impossible. It appears that the unfortunate Spaniards had in the late war this kind of insidious foe to deal with, as well as their more generous American enemies; at least, so it would appear from the report of a United States naval officer who visited the *Maria Teresa* after the destruction of Admiral Cervera's fleet. Here he found a number of cartridges arranged in groups of five ready to charge the magazines of the Mauser rifles; and if the bulk of the Spanish cartridges were of this particular make, it is not a matter for wonder that so little execution was done among the American troops. These so-called cartridges consisted of a metal shell filled with hair, with a sprinkling of gunpowder, and a bullet made, not of lead, but of wood! We doubt whether the rascally contractor who supplied his country's soldiers with such rubbish will ever be run to earth; but surely a few patriotic Spaniards may be found who will institute an inquiry into the matter.

DEPOSITING METALS ON WOOD.

According to the *Electrical World*, a new industry is springing up in Germany in the electrical deposition of different metals upon wood, in the same manner that such metals are commonly deposited upon other materials, as in electroplating and electrotyping. There is little doubt that there is a demand for such an industry, for suitable designs in wood which could be coated with copper, brass, or nickel would supersede to a great extent the far more expensive work in the solid metals themselves, just as electroplating serves so widely for solid silver. There are many ways in which wood may be given a conducting surface, so that metal will adhere to it in the plating-bath; but some of these cause the material to expand by the absorption of moisture. The plan recommended is to first immerse the wood in melted paraffin-wax; then to place it in a bath of gasoline, which dissolves the paraffin near the surface without touching that which has soaked into the pores; after which the wood receives a coating of some metallic salt which gives it a conducting surface. It is now immersed in the plating-bath, and quickly acquires a metallic surface of any required thickness.

PHOTOGRAPHY THE HANDMAID OF ASTRONOMY.

Sir Norman Lockyer, the first authority on spectroscopic work in this country, recently gave at the Camera Club, London, a most interesting account of his twenty-eight years of labour in this difficult field of scientific research, and explained in a popular manner the way in which it was possible, by means of the spectroscope, to ascertain the actual composition of the distant stars. He said that the advance in methods of observation had been so rapid that it was now

possible to get spectra of the stars to the third magnitude as good in quality as those obtained of the sun itself twenty years ago. This advance had been mainly due to photography. 'Stop photography,' said he, 'and you stop astronomy as we now understand it.' The lecturer also said, in speaking of the enormous importance of photographic records, that it was a waste of time for the astronomical student to use his eyes, save to see that the apparatus was all right. By means of photography, millions of facts are accumulated automatically which can be studied subsequently, and such facts are reliable in that they are not biased by the personality of the observer. It seems curious that a great authority should gravely state that in making observations during a total eclipse 'it is ridiculous to waste one moment in looking at anything.' Truly photography may be called the astronomer's handmaid.

COMMERCIAL ELECTRICITY.

An important electrical enterprise is being talked about, and a bill will probably be introduced into parliament next session to give it life. The scheme, which is being backed by several influential manufacturers and capitalists, is to establish a large system of generating and distributing electric stations in the midland counties, so that the chief manufacturing districts can be supplied with currents for all purposes, including the working of railways and tramways. The various towns comprised in the scheme will be connected by electric mains laid along the highways, so that any manufacturer or resident can be supplied with electricity to be paid for by meter. This will be an enormous boon, especially to the small manufacturer, for it has long ago been proved by many that the working of small machines by the electric current is very economical. In most cases current can be supplied for such a purpose during the daylight hours at a much cheaper rate than at night, when the demand for lighting is likely to tax the full capacity of the supply station.

THE X-RAYS IN WARFARE.

It was long ago anticipated that Professor Röntgen's marvellous discovery of those invisible rays—which will easily penetrate certain substances, while they are obstructed by others—would prove of signal value in the hands of army surgeons. For the exact situation of bullets or fragments of metal in the flesh can be easily detected; indeed, such metallic bodies can be seen by interposing between the eye and the wounded part a fluorescent screen. In this case anticipation has been justified, and now every body of troops on active service carries the X-ray apparatus as part of its necessary equipment. Surgeon-major Bevor recently gave at a lecture a most interesting account of his work with the apparatus during the Afride campaign on the north-western frontier

of India, and spoke most highly of its merits. The Afridis are a brave and warlike race, but they are not very particular as to the missiles which they fire against opponents, provided those missiles are hard and heavy. When bullets run short they use bits of telegraph-wire, nails, stones, or anything that may be at hand; and, in consequence of this custom, the wounds received by our troops were of the most varied kind, and of great interest from a surgical point of view. Small fragments of metal which set up grievous inflammation, and in some cases blood-poisoning, with every prospect of a fatal termination, were detected by the useful X-rays, and removed. In many a case life was thus saved which must have been sacrificed in the absence of such a detector. Many of the Surgeon-major's patients were treated at the front and under fire.

CHRISTMAS ISLAND.

A most interesting account of this lonely island of the Indian Ocean was recently given before the Royal Geographical Society by Mr C. W. Andrews, who spent twelve months in its exploration. Many previous attempts have been made to explore the island, but this is the first time that the work has been thoroughly accomplished. The island is about the same size as Jersey; but, instead of being thickly populated, the total number of inhabitants when Mr Andrews left the island in May last was forty. Several coolies have since been imported from Java to work the valuable deposits of phosphate of lime which are found on the island. There are only five species of mammals in the place: two kinds of rats, a shrew-mouse, and two bats. The rats swarm everywhere, for there is abundance of food, and no enemies to check their increase. One of the bats, a large fruit-bat, is described as a great nuisance, not only because of the amount of fruit it destroys, but also because of its harsh scream. A peculiarity is that this creature has abandoned nocturnal habits, and can be seen circling about high in the air in sunlight—sometimes in the middle of the day. The climate of Christmas Island is a delightful one; and it is thoroughly healthy, for there are no marshes or stagnant pools, and plenty of fresh water.

A NEW ILLUMINANT.

M. Denayrouze has invented a new form of spirit-lamp by which it is claimed that the maximum amount of light, with the minimum of cost, is to be obtained; and by so doing has solved the long-contested question whether alcohol, properly treated, has or has not magnificent lighting qualities. M. Denayrouze recently gave an exhibition and explanation of the different models of his new spirit-lamp before the French Minister of Finance, with perfectly satisfactory results. The competence of M. Denayrouze is beyond dispute. Twenty years ago he was one of the original pro-

moters of the electric light; some years later he was among the first to experiment in gas-lighting with that great reform—incandescence; and but a few months since Paris, after many trials of the best methods for illuminating her principal thoroughfares, adopted his magnificent form of gas-lighting, which has also had great success in other countries. It will therefore be easily understood that when this *doyen* of engineers in the lighting world announced and demonstrated before the French Agricultural Society that, in his practised and capable hands, alcohol had become an element without parallel in the production of light, the news naturally produced a veritable sensation, which has spread far and wide. In the laboratory where his experiments have been made, M. Denayrouze has exhibited various models of lamps intended for the burning of alcohol, of which the smallest burning-point is not larger than a glow-worm, though it nevertheless gives the light of a good gas-jet. There are, of course, lamps of all sizes. The largest is mounted on a tripod, after the fashion of a drawing-room lamp for petroleum burning. From this sphere emerge many luminous points, the flame from which gives the effect of a ball of fire as large as two fists; while the light emanating from this novel arrangement gives an illumination double that of the electric candelabra of the Boulevards. It is all so perfect and so simple as to leave the examiner both puzzled and doubtful. For reasons which are easily to be understood, since the lamp is not yet before the public, the exact explanation of M. Denayrouze's valuable invention cannot be given here; but he asserts that, with a can of alcohol and half-a-dozen copper pipes, finger size, the poorest village can be most brilliantly illuminated.

A SONNET.

'To be and not to do!' To idly lie
With feeble, nerveless hands that try in vain
To use the winged hours that hurry by—
The golden hours that ne'er can come again.
Oh, great and unsolved mystery of pain,
Which dulls the music of Time's busy loom,
And twists Life's threads into a complex skein,
And fills the sunny world with sunless gloom!

Hush, hush! in patience still possess thy soul,
Till the clear shining comes which follows rain;
When all Life's broken threads shall be made whole,
And what was counted loss prove truest gain.
Then let the lips that murmured smile and say:
'The path of suffering was the perfect way!'

E. MATHESON.

* * TO CONTRIBUTORS.

- 1st. All communications should be addressed 'To the Editor, 339 High Street, Edinburgh.'
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